



MSO Series

Circle output flange
Right-angle type gearbox, Standard



MAO Series

Circle output flange
Right-angle type gearbox, Standard

- Best-in-class backlash
- High output torque
- Low noise level
- High efficiency
- Maintenance free
- Balanced motor pinion
- Gear ratios available from 3:1 up to 200:1
- No need to replace lubrication to expand the lifespan

		MSO				
Stage	Gear ratio	040	060	080	120	160
1A	3~10	○	○	○	○	○
2B	15~100	⊗	○	○	○	○
2A	15~100	○	○	○	○	○
1M/2M	3~100	⊗	⊗	⊗	⊗	⊗

		MAO				
Stage	Gear ratio	040	060	080	120	160
1A	3~10	○	○	○	○	○
	14, 20	⊗	○	○	○	○
2B	15, 20	⊗	⊗	⊗	⊗	⊗
	25~100	⊗	○	○	○	○
	120~200	⊗	⊗	○	○	○
2A	15, 20	○	⊗	⊗	⊗	⊗
	25~100	○	○	○	○	○
	120~200	⊗	○	○	○	○
1M/2M	3~200	⊗	⊗	⊗	⊗	⊗

○ : Standard, △: Custom made, ⊗ : Contact sales person.



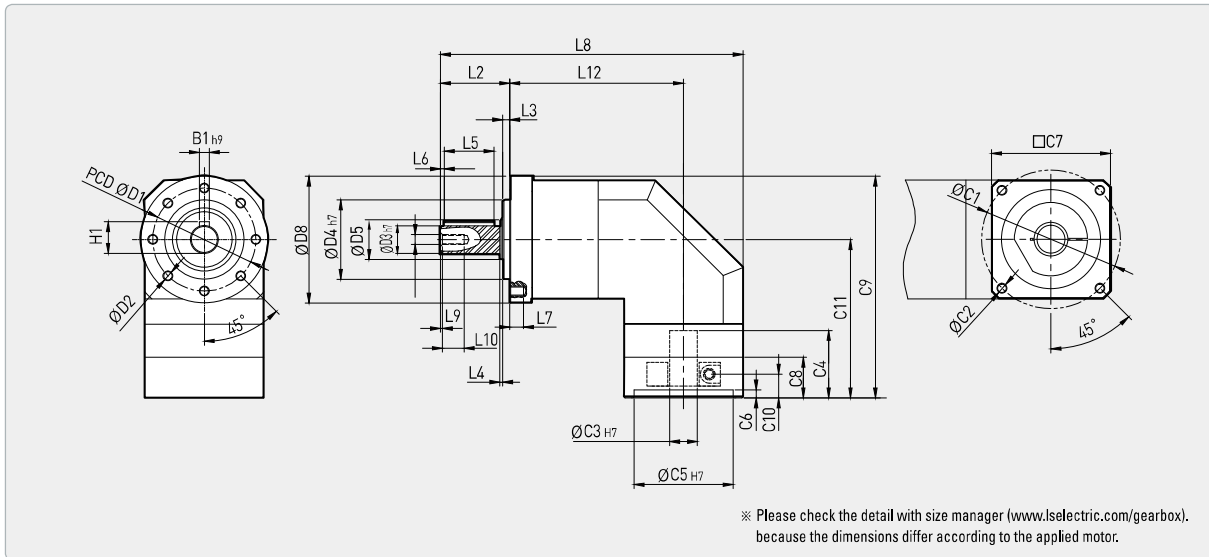
MAO Series

Division	Stage	Gear ratio	040	060	080	120	160	
Nominal Output Torque (Nm)	1	3	20	57	148	272	484	
		4	18	51	143	295	549	
		5	19	54	160	332	634	
		6	18	50	151	311	592	
		7	17	48	145	305	562	
		8	16	44	132	279	527	
		9	14	42	123	254	483	
		10	14	42	121	262	500	
		14	-	44	145	305	562	
		15	14	-	-	-	-	
	20	14	42	121	262	500		
	2	25	19	54	160	332	634	
		30	18	50	151	311	592	
		35	17	48	145	305	562	
		40	16	44	132	279	527	
		45	14	42	123	254	483	
		50	19	54	160	332	634	
		60	18	50	151	311	592	
		70	17	48	145	305	562	
		80	16	44	132	279	527	
		90	14	42	123	254	483	
		100	14	42	121	262	500	
		120	-	-	151	311	592	
		140	-	-	145	305	562	
		160	-	-	132	279	527	
180		-	-	123	254	483		
200	-	-	121	262	500			
Emergency Stop Torque (Nm)	1,2	3~200	3 times nominal output torque					
Nominal Input Speed (rpm)	1,2	3~200	5,000	5,000	4,000	4,000	3,000	
Max. Input Speed (rpm)	1,2	3~200	10,000	10,000	8,000	8,000	6,000	
Torsional Rigidity (Nm/Arcmin)	1,2	3~200	3	7	14	26	55	
Max. Radial Load (N)	1,2	3~200	750	1,280	3,200	6,800	9,300	
Max. Axial Load (N)	1,2	3~200	390	690	1,600	3,400	4,500	
Backlash (Arcmin)	S	1	3~20	≤ 8	≤ 8	≤ 8	≤ 8	≤ 8
		2	25~200	≤ 11	≤ 11	≤ 11	≤ 11	≤ 11
Service Life (Hrs)	1,2	3~200	20,000 (10,000 under continuous operation)					
Efficiency (%)	1	3~20	≥ 95					
	2	25~100	≥ 92					
Weight (kg)	1A	3~20	≤ 0.9	≤ 1.5	≤ 6.0	≤ 12.0	≤ 24.0	
	2A	25~200	≤ 1.2	≤ 2.0	≤ 7.5	≤ 13.5	≤ 26.0	
	2B	25~200	-	≤ 1.9	≤ 7.3	≤ 12.8	≤ 25.0	
Operating Temp (°C)	1,2	3~200	-10 ~ 90					
Lubrication	1,2	3~200	Grease (VIGO Grease RE #0)					
Degree of Gearbox Protection	1,2	3~200	IP65					
Noise (dB)	1,2	3~200	≤ 58	≤ 60	≤ 63	≤ 66	≤ 69	
Inertia (kgcm ²)	1A	3~10	0.09	0.36	2.27	6.88	23.50	
		14, 20	-	0.08	1.89	6.23	21.75	
		15, 20	-	-	-	-	-	
	2B	25~100	-	0.09	0.36	2.27	6.88	
		120~200	-	-	0.32	1.89	6.23	
	2A	15, 20	0.09	-	-	-	-	
	25~100	0.09	0.36	2.27	6.88	23.50		
	120~200	-	-	1.89	6.23	21.75		

(1) Considering safety factors, nominal output torque is calculated. (2) Max. output torque is equivalent to 60% of the emergency stop torque.

Single Stage

Drawing of Planetary Gearbox



Dimension	MAO0401A	MAO0601A	MAO0801A	MAO1201A	MAO1601A
D1	34	52	70	100	145
D2	M4 X 0.7P, DP:7	M5 X 0.8P, DP:8	M6 X 1.0P, DP:10	M10 X 1.5, DP:16	M12 X 1.75, DP:22
D3 h7	10	14	20	25	40
D4 h7	26	40	60	80	130
D5	15	20	30	32	60
D6	M4 X 0.7P	M5 X 0.8P	M8 X 1.25P	M12 X 1.75P	M16 X 2.0P
D7	-	-	-	-	-
D8	49	64	94	119	159
L1	-	-	-	-	-
L2	26	35	40.5	55	87
L3	2	3.5	2.5	4	5
L4	1	1.5	1.5	5	3
L5	18	25	28	40	65
L6	1	2	3	3	5
L7	7	8	10	16	22
* L8	117	152.7	203	270	352
L9	1.5	1.5	1.5	2	2
L10	9.5	12	14.5	18	34
L11	-	-	-	-	-
L12	68.5	87.7	117.5	150	175
* C1	46	70	90	145	200
* C2	M4 X 0.7P	M5 X 0.8P	M6 X 1.0P	M8 X 1.25P	M12 X 1.75P
* C3 H7	8 (14)	14 (19)	19 (24)	24 (35)	35 (42)
* C4	26.5	34	43.1	62	82
* C5 H7	30	50	70	110	114.3
* C6	4	4	6	7	7
* C7	45	60	90	132	180
* C8	17	20.5	23.5	42	47
* C9	85	112	154	202	248.5
* C10	10	12	13.4	28	29.5
* C11	60.5	80	107	142.5	169
B1 h9	3	5	6	8	12
H1	11.2	16	22.5	28	43

(1) C1-C10 is dimension for input shaft parts. Dimensions differ by motor types and makers. Find CAD file for exact dimensions of gearbox in www.lselectric.com/gearbox.

(2) In XYY, YY means fit tolerance (KS B 0401).

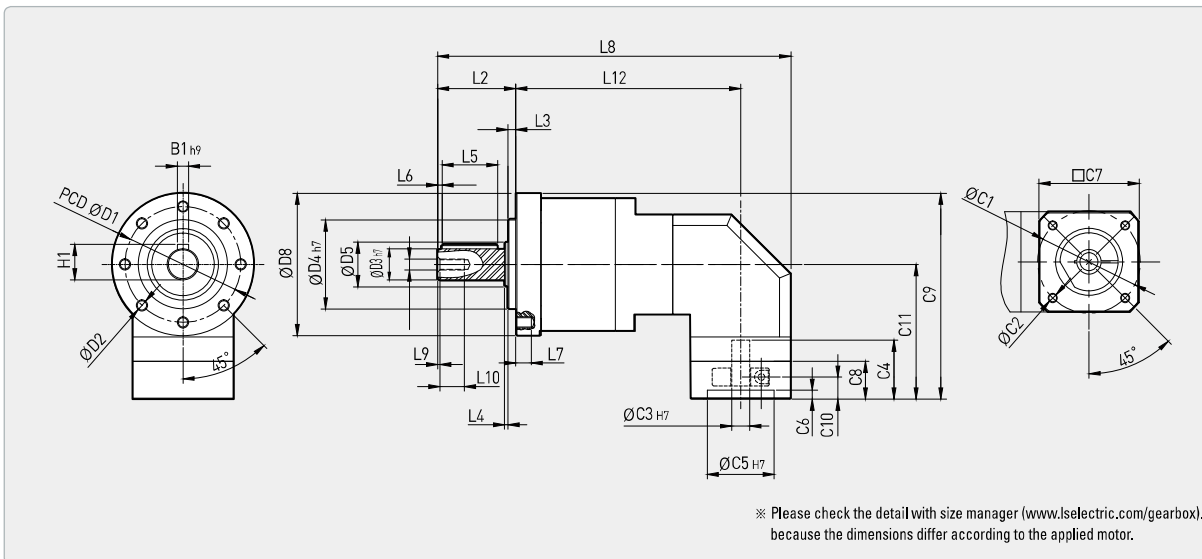
(3) (is M Type-made to order.



MAO Series

Double Stage B Type

Drawing of Planetary Gearbox



Dimension	MAO0602B	MAO0802B	MAO1202B	MAO1602B
D1	52	70	100	145
D2	M5 X 0.8P , DP:8	M6 X 1.0P , DP:10	M10 X 1.5 , DP:16	M12 X 1.75 , DP:22
D3 h7	14	20	25	40
D4 h7	40	60	80	130
D5	20	30	32	60
D6	M5 X 0.8P	M8 X 1.25P	M12 X 1.75P	M16 X 2.0P
D7	-	-	-	-
D8	64	94	119	159
L1	-	-	-	-
L2	35	40.5	55	87
L3	3.5	2.5	4	5
L4	1.5	1.5	5	3
L5	25	28	40	65
L6	2	3	3	5
L7	8	10	16	22
* L8	158.5	205.7	275.5	367.5
L9	1.5	1.5	2	2
L10	12	14.5	18	34
L11	-	-	-	-
L12	123.5	135.2	175.5	215.5
* C1	46	70	90	145
* C2	M4 X 0.7P	M5 X 0.8P	M6 X 1.0P	M8 X 1.25P
* C3 H7	8 (14)	14 (19)	19 (24)	24 (35)
* C4	26.5	34	43.1	62
* C5 H7	30	50	70	110
* C6	4	4	6	7
* C7	45	60	90	132
* C8	17	20.5	23.5	42
* C9	92.5	127	166.5	222
* C10	10	12	13.4	28
* C11	60.5	80	107	142.5
B1 h9	5	6	8	12
H1	16	22.5	28	43

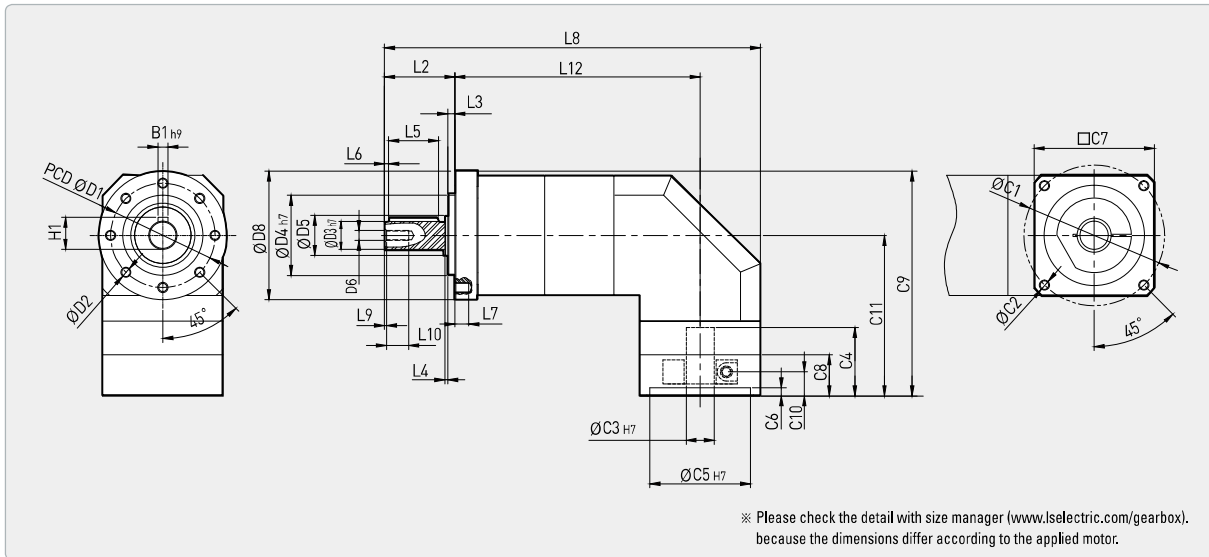
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(2) In XYY, YY means fit tolerance (KS B 0401).

(3) () is M Type-made to order.

Double Stage A Type

Drawing of Planetary Gearbox



Dimension	MAO0402A	MAO0602A	MAO0802A	MAO1202A	MAO1602A
D1	34	52	70	100	145
D2	M4 X 0.7P, DP:7	M5 X 0.8P, DP:8	M6 X 1.0P, DP:10	M10 X 1.5, DP:16	M12 X 1.75, DP:22
D3 h7	10	14	20	25	40
D4 h7	26	40	60	80	130
D5	15	20	30	32	60
D6	M4 X 0.7P	M5 X 0.8P	M8 X 1.25P	M12 X 1.75P	M16 X 2.0P
D7	-	-	-	-	-
D8	49	64	94	119	159
L1	-	-	-	-	-
L2	26	35	40.5	55	87
L3	2	3.5	2.5	4	5
L4	1	1.5	1.5	5	3
L5	18	25	28	40	65
L6	1	2	3	3	5
L7	7	8	10	16	22
* L8	146	187.2	247	295.5	392.5
L9	1.5	1.5	1.5	2	2
L10	9.5	12	14.5	18	34
L11	-	-	-	-	-
L12	97.5	122.2	161.5	175.5	215.5
* C1	46	70	90	145	200
* C2	M4 X 0.7P	M5 X 0.8P	M6 X 1.0P	M8 X 1.25P	M12 X 1.75P
* C3 H7	8 (14)	14 (19)	19 (24)	24 (35)	35 (42)
* C4	26.5	34	43.1	62	82
* C5 H7	30	50	70	110	114.3
* C6	4	4	6	7	7
* C7	45	60	90	132	180
* C8	17	20.5	23.5	42	47
* C9	85	112	154	186.4	240.5
* C10	10	12	13.4	28	29.5
* C11	60.5	80	107	126.9	161
B1 h9	3	5	6	8	12
H1	11.2	16	22.5	28	43

(1) C1-C10 is dimension for input shaft parts. Dimensions differ by motor types and makers. Find CAD file for exact dimensions of gearbox in www.lselectric.com/gearbox.

(2) In XYY, YY means fit tolerance (KS B 0401).

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